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EXAMINER	
BELLO, AGUSTIN	

ART UNIT	PAPER NUMBER
2633	7

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/748,259	ABURAKAWA ET AL.	
	Examiner	Art Unit	
	Agustin Bello	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-10 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-10 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Throughout the claims the applicant refers to the base stations as radio base station regardless of whether or not the base station actually receive radio or optical signals from the central control station. In doing so, the exact operating realm of the base stations becomes indeterminate.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claim 9 is rejected under 35 U.S.C. 102(e) as being anticipated by Sonetaka (U.S. Patent No. 6,487,392).

Regarding claim 9, Sonetaka teaches a radio-base-station system, comprising: a plurality of radio base stations (reference numeral 3 in Figure 1); and a central control station (reference numeral 2 in Figure 1) controlling said radio base stations and connected to some of said radio

base stations directly via optical fibers (reference numeral 202 in Figure 1), wherein one of said radio base stations includes a radio transmission unit configured to transmit a radio frequency signal to another one of said radio base stations (as seen in Figures 1 and 2), whereby said one of said radio base stations receives a signal having a radio frequency from the central control station (reference numeral 201, 301 in Figure 1), and transmits the signal received from the central control station to said another one of said radio base stations (as indicated by the arrow between the upper two base stations 3 in Figure 1).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-2, 4-7, and 10, as best understood by the examiner in view of the 112 rejections above, are rejected under 35 U.S.C. 103(a) as being unpatentable over Sonetaka (U.S. Patent No. 6,487,392) in view of Karasawa (U.S. Patent No. 5,493,436).

Regarding claims 1 and 7, Sonetaka teaches a central control station (reference numeral 2 in Figure 1), which controls radio base stations (reference numeral 3 in Figure 1) connected thereto via radio links (reference numeral 201, 301 in Figure 1) and optical fiber links (reference numeral 202 in Figure 1), comprising: an upper level station (reference numeral 1 in Figure 1), and a distribution unit which distributes the converted signals to the radio links and the optical fiber links (inherent in the distribution of signals to the Base stations 3). Sonetaka differs from the claimed invention in that Sonetaka fails to specifically teach a demultiplexing unit which

demultiplexes signals supplied from an upper-level station and signal conversion units which convert the respective demultiplexed signals into converted signals having a unified transmission format. However, the use of a demultiplexing unit and signal conversion units within a central control station is well known in the art. Karasawa, in the same field of endeavor, teaches it is well known in the art to demultiplex a signal (reference numeral 1 in Figure 4) supplied from an upper-level station and convert the respective signals (reference numeral S0 in Figure 4) into signals having a unified transmission format (reference numeral S1 in Figure 4). One skilled in the art would have been motivated to demultiplex the signals received from an upper-level station and convert the respective signals in order to distribute the demultiplexed signals to a plurality of base station and to do so in a signal format compatible with the base stations. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to demultiplex a signal supplied from an upper-level station and convert the respective signals into signals having a unified transmission format.

Regarding claim 2, the combination of Sonetaka and Karasawa teaches that said central control station further comprising: a radio frequency conversion unit (inherent in that the central control station transmits a signal via a radio frequency via antenna 201 in Figure 1 in Sonetaka) which converts one of signals into a radio frequency signal having a radio frequency; a radio transmission unit (reference numeral 201 in Figure 1 in Sonetaka) which transmits the radio frequency signal to one of the radio base stations; and an optical signal transmission unit (inherent in that fiber 202 in Figure 1 is used to transmit an optical signal from the central control station to the base station in Sonetaka) which transmits one of the signals to one of the radio base stations after conversion thereof into an optical signal, whereby the signals from the upper-level

station are transmitted by the radio transmission unit (reference numeral 201 in Figure 1 in Sonetaka) to the one of the radio base stations (reference numeral 3 in Figure 1 in Sonetaka) connected to the central control station via one of the radio links, and are transmitted by the optical signal transmission unit (inherent as discussed above) to the one of the radio base stations connected to the central control station via one of the optical fiber links (reference numeral 202 in Figure 1 in Sonetaka). The combination of references differs from the claimed invention in that it fails to specifically teach that said signal conversion units are intermediate-frequency conversion units that convert the respective demultiplexed signals into intermediate frequency signals having an intermediate frequency. However, conversion of signals to an intermediate frequency is very well known in the art of communication. One skilled in the art would have been motivated convert the demultiplexed signals into intermediate frequency signals in order to gather the demultiplexed signals into separate and distinct frequency bands for transmission to the base stations. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to convert the demultiplexed signals into intermediate frequency signals via the conversion units of the combination of references.

Regarding claim 4, the combination of references teaches that said signal conversion units are radio-frequency conversion units (inherent in that at least one of the signals is transmitted between the central control station and the base station in Sonetaka) which convert the respective demultiplexed signals into radio frequency signals having a radio frequency, and said central control station further comprising: a radio transmission unit (reference numeral 201 in Figure 1 in Sonetaka) which transmits one of the radio frequency signals to one of the radio base stations (reference numeral 301 in Figure 1 in Sonetaka); and an optical signal transmission

unit (inherent in that fiber 202 in Figure 1 is used to transmit an optical signal from the central control station to the base station in Sonetaka) which transmits one of the signals to one of the radio base stations after conversion thereof into an optical signal, whereby the signals from the upper-level station are transmitted by the radio transmission unit to the one of the radio base stations connected to the central control station via one of the radio links (reference numeral 201, 301 in Figure 1 in Sonetaka) , and are transmitted by the optical signal transmission unit to the one of the radio base stations connected to the central control station radio frequency via one of the optical fiber links (reference numeral 202 in Figure 1). The combination of references differs from the claimed invention in that fails to specifically teach that an optical signal is used to transmit a radio frequency signal to the base station on an optical signal. However, modulation of an optical signal with a radio frequency is very well known in the art. Furthermore, Karasawa teaches that it is well known in the art to modulate an optical signal with a radio frequency signal (column 3 lines 7-11). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modulate an optical signal transmitted from the central control station with a radio frequency signal and transmitted the radio frequency modulated signal to a base station via an optical fiber.

Regarding claim 5, the combination of references teach said signal conversion units are base-band modulation units (column 2 lines 30-39 in Sonetaka) which convert the respective demultiplexed signals into base-band signals, and said central control station further comprising: a radio frequency conversion unit which converts the signal into a radio frequency signal having a radio frequency (inherent in the transmission of a radio frequency from the central control station to the base station); a radio transmission unit (reference numeral 201 in Figure 1 in

Sonetaka) which transmits the radio frequency signal to one of the radio base stations; an optical signal conversion unit (inherent in that fiber 202 in Figure 1 is used to transmit an optical signal from the central control station to the base station) which converts one of the base-band signals into a signal for optical fiber communication; and an optical signal transmission unit (reference numeral 3 in Figure 4 of Karasawa) which converts the signal for optical fiber communication into an optical signal, and transmits the optical signal to one of the radio base stations, whereby the signals from the upper-level station are transmitted by the radio transmission unit to the one of the radio base stations connected to the central control station via one of the radio links, and are transmitted by the optical signal transmission unit to the one of the radio base stations connected to the central control station via one of the optical fiber links (as discussed in the previous claims). The combination of references differs from the claimed invention in that it fails to specifically teach a digital-to-analog conversion unit that converts one of the base-band signals into an analog signal. However, digital to analog converters are very well known in the art. One skilled in the art would have been motivated to use a digital to analog converter in the system of the combination of references in order to modulate the optical signal with the analog signal. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to use a digital-to-analog conversion unit that converts one of the base-band signals into an analog signal in the system of the combination of references.

Claim 6 recites limitations similarly recited in the previous claims, with the difference between the cited art and the claim being conversion of the signals between different formats. However, as discussed above digital to analog conversion, conversion of an analog signal to a

radio signal, conversion of a base band frequency to a intermediate frequency, and radio/optical transmission of the signal formats is well known in the art.

Regarding claim 10, the Sonetaka teaches the limitation similarly claimed in the previous claims but differs from the claimed invention in that Sonetaka fails to specifically teach that one of the base station has a digital to analog converter to convert a digital signal received from the central station to an analog form before transmitting the signal to another base station on a radio frequency. However, digital to analog signal conversion is very well known in the art. One skilled in the art would have been motivated to convert the signal from digital form to analog form in order to modulate the radio frequency with the analog signal. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to convert the digital signal received from the central control to an analog signal before transmission to another base station on a radio frequency.

6. Claims 3 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sonetaka in view of Karasawa and Lee (U.S. Patent No. 6,310,705).

Regarding claim 3, the combination of Sonetaka and Karasawa teaches a radio transmission unit (reference numeral 201 in Figure 1) which transmits one of the radio frequency signals to one of the radio base stations (reference numeral 3 in Figure 1); and an optical signal transmission unit (inherent in that fiber 202 in Figure 1 is used to transmit an optical signal from the central control station to the base station) which transmits the intermediate frequency signal (as discussed in regard to claim 2) or one of the radio frequency signals to one of the radio base stations after conversion thereof into an optical signal. The combination of references also teaches that the signals from the upper-level station are transmitted by the radio transmission unit

(reference numeral 201 in Figure 1) to the one of the radio base stations (reference numeral 3 in Figure 1) connected to the central control station via one of the radio links, and are transmitted by the optical signal transmission unit (inherent in that fiber 202 in Figure 1 is used to transmit an optical signal from the central control station to the base station) to the one of the radio base stations connected to the central control station via one of the optical fiber links (reference numeral 202 in Figure 1). The combination of references further teaches that said signal conversion units are radio-frequency conversion units (inherent in that a radio frequency is communicated between the base station and the central control node in Figure 1) that convert the respective demultiplexed signals into radio frequency signals having a radio frequency. The combination of references differs from the claimed invention in that it fails to specifically teach that and said central control station further comprises: an intermediate frequency conversion unit which converts one of the radio frequency signals into an intermediate frequency signal having an intermediate frequency. However, conversion of radio signals to an intermediate frequency is very well known in the art of communication. Lee, in the same field of endeavor, teaches it is well known in the art to convert a radio frequency into an intermediate frequency (column 2 lines 25-27). One skilled in the art would have been motivated convert the radio signals into intermediate frequency signals in order to gather the demultiplexed signals into separate and distinct frequency bands for transmission to the base stations via the optical fiber. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to convert the radio signals into intermediate frequency signals before transmission onto the optical fiber.

Regarding claim 8, the combination of references and Sonetaka in particular teach a radio-base-station system, comprising: a plurality of radio base stations (reference numeral 3 in

Figure 1); and a central control station (reference numeral 2 in Figure 1) controlling said radio base stations and connected to some of said radio base stations directly via optical fibers (reference numeral 202 in Figure 1), wherein one of said radio base stations includes a radio frequency conversion unit configured to convert a signal into a radio frequency signal (radio output of the base station in Figure 1) and a radio transmission unit (reference numeral 302 in Figure 1) configured to transmit the radio frequency signal to another one of said radio base stations (as seen in Figures 1, 2), whereby said one of said radio base stations receives a signal from the central control station, and transmits the signal received from the central control station to said another one of said radio base stations (as seen in Figures 1,2). The combination of Sonetaka and Karasawa differs from the claimed invention in that in that it fails to specifically teach conversion of an intermediate frequency received from the central control station to a radio frequency signal for transmission to another base station. However, conversion of intermediate frequency signals to radio signals is very well known in the art of communication. Lee, in the same field of endeavor, teaches it is well known in the art to convert a radio frequency into an intermediate frequency (column 2 lines 25-27) and vice versa. One skilled in the art would have been motivated convert the intermediate frequency signals into radio signals in order to propagate the information carried on the intermediate frequency via a radio frequency. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to convert the intermediate frequency signals into radio signals before transmission to another base station.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Driessen, Tang, Imajo, Hamilton-Piercy, Koonen, Darcie, and Sasai teach relevant art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Agustin Bello whose telephone number is (703)308-1393. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (703)305-4729. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-3900.

AB

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